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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/729,443	12/04/2000	Steven T. Jaffe	36928/NJP/B600	6265

23363 7590 12/22/2004

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EXAMINER	
TORRES, JUAN A	
ART UNIT	**PAPER NUMBER**
2631	

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/729,443	Applicant(s) JAFFE ET AL.	
	Examiner Juan A. Torres	Art Unit 2631	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-61* is/are rejected.

7)☒ Claim(s) *4,12 and 45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11172004*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed on December 3, 2000, page 4 last 4 references (SCHLEGEL, CHRISTIAN, Trellis Coding, 1997, IEEE Press, Piscataway, New Jersey (entire book); HEEGARD, CHRIS, et al., Turbo Coding, 1999, Kluwer Academic Publishers, Norwell, Massachusetts (entire book); VUCETIC, BRANKA, et al., Turbo Codes Principles and Applications, 2000, Kluwer Academic Publishers, Norwell, Massachusetts (entire book); SKLAR, BERNARD, Digital Communications Fundamentals and Applications, Second Edition, 2001, Prentice Hall PTR, Upper Saddle River, New Jersey (entire book)) fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered because these books are not in the file.

Drawings

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: in page 2 line 14 the recitation "a function of the first and second signals" is vague and indefinite, it is suggested to be changed to" a function of the first and second symbols".

Appropriate correction is required.

Claim Objections

Claim 4 is objected to because of the following informalities: the recitation "the adjustment of the multiplied first signal comprises Viterbi decoding the multiplied first signal" is vague and indefinite. It is suggested to be changed to "the adjustment of the multiplied first signal comprises Viterbi decoding".

Claim 12 is objected to because of the following informalities: the recitation "the signals comprises interleaving and de-interleaving the turbo encoded signals before transmission." is indefinite. It is suggested to be changed to "the signals comprises interleaving and de-interleaving of the turbo encoded signals before transmission".

In claim 45 line 1 the recitation "The method of claim 45" is indefinite. It is suggested to be changed to "The method of claim 33" (a claim can not make reference so itself and 45 refers to itself).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 7, 9, 13-14, 38-39 and 46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure doesn't teach the use of a third signal between the first and second signal.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-8, 10-11, 15-19, 21-25, 27-31,33-36, 40-45, 47-51 and 53-59 are rejected under 35 U.S.C. 102(a) as being anticipated by Langlais et al. ("Synchronization in the carrier recovery of a satellite link using turbo-codes with the help of tentative decisions", IEE Colloquium on Turbo Codes in Digital Broadcasting - Could It Double Capacity? 22 Nov. 1999 pages: 5/1 - 5/7).

As per claim 1 Langlais et al. teach a method of processing signals, comprising: receiving first and second signals each being modulated on a carrier signal, the first

signal preceding the second signal in time (figure 2 page 5/1 section II.A); multiplying each of the first and second signals with a reference signal having a reference frequency (figure 2 multiplier after y(k) page 5/1 section II.A); adjusting the multiplied first signal based on the multiplied first and second signals (figure 2 phase detector page 5/1 section II.A); comparing the adjusted first signal to the multiplied first signal (figure 2 phase detector page 5/1 section II.A); and adjusting the reference frequency as a function of the comparison (figure 2 output of loop filter page 5/1 section II.A).

As per claim 2 Langlais et al. teach a method where the first and second signals each comprises turbo-encoded data (figure 2 page 5/1 section II.A first paragraph).

As per claim 3 Langlais et al. teach that the multiplied first and second signals each comprises a baseband signal (figure 2 output of mapper page 5/1 section II.A first paragraph and reference [7]).

As per claim 4 Langlais et al. teach the adjustment of the multiplied first signal comprises Viterbi decoding the multiplied first signal (figure 2 and page 5/1 section II.A first paragraph last line).

As per claim 5 Langlais et al. teach that the comparison of the adjusted first signal with the multiplied first signal comprises detecting a phase difference between the adjusted first signal and the multiplied first signal (figure 2 and page 5/1 section II.A).

As per claim 6 Langlais et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase

difference between the adjusted first signal and the multiplied first signal (figure 2 and page 5/1 section II.A, the VCO in inherited in the PLL see figure 3).

As per claim 7 Langlais et al. teach that the adjustment of the reference frequency comprises adjusting the reference frequency to be substantially equal to a frequency of the carrier signal (figure 2 and page 5/2 section III.A).

As per claim 8 Langlais et al. teach that the first and second received signals each comprises a symbol representing a constellation point, and wherein the adjustment of the multiplied first signal comprises quantizing the multiplied first signal to its nearest constellation point as a function of the multiplied first and second signals (figure 2 and page 5/1 section II.A).

As per claim 10 Langlais et al. teach that the transmitting signals including the first and second signals, wherein the receiving of the first and second signals comprises receiving the transmitted signals (figure 2 and page 5/1 section II.A).

As per claim 11 Langlais et al. teach that the transmission of the signals comprises turbo encoding the signals before transmission (figure 2 and page 5/1 section II.A inherit to the turbo decoder will be a turbo encoder).

As per claim 15 Langlais et al. teach a receiver, comprising: an oscillator having a reference signal output with a tunable reference frequency (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3); a multiplier to multiply a first signal with the reference signal, and to multiply a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); a

decoder to adjust the multiplied first signal based on the multiplied first and second signals (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A); and a detector to compare the adjusted first signal with the multiplied first signal, the detector being adapted to tune the reference frequency as a function of the comparison (figure 2 phase detector page 5/1 section II.A).

As per claim 16, 22 and 28 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3).

As per claim 17, 23 and 29 Langlais et al. teach that the decoder comprises a Viterbi decoder (figure 2 and page 5/1 section II.A first paragraph last line).

As per claim 18, 24 and 30 Langlais et al. teach that the in the Turbo4, the trellis length of DEC1 is equal to 29 bits which limits the number of accessible decoded symbols to 29 for a 1/2 rate encoder. Therefore, the possible values that delay Tr can take a: $0 \preceq Tr \preceq 28Ts$ where Ts is the symbol duration and Tr=dTs In the case of zero delay tentative decision, the extraction is performed at the input of the trellis. The decision results from the selection of the trellis path just after the corresponding bits have entered the DEC1 decoding trellis, this case does not consider future values of the signal only past values (page 5/2 first paragraphs).

As per claim 19, 25 and 31 Langlais et al. teach that the detector comprises a phase detector to compare a phase of the adjusted first signal with a phase of the multiplied first signal, the phase detector being adapted to tune the reference frequency as a function of a difference in phases (figure 2 phase detector page 5/1 section II.A).

As per claim 21 Langlais et al. teach a receiver, comprising an oscillator having a tuning input (figure 2 and page 5/1 section II.A the VCO in inherited in the PLL see figure 3); a multiplier having a first input to receive a signal, and a second input coupled to the oscillator, the signal comprising a first signal and a second signal succeeding the first signal in time, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); a decoder having an input coupled to the multiplier, and an output (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A); and a detector having a first input coupled to the decoder input, a second input coupled to the decoder output, and an output coupled to the tuning input of the oscillator (figure 2 phase detector page 5/1 section II.A).

As per claim 27 Langlais et al. teach a receiver, comprising oscillator means for generating a reference signal having a tunable reference frequency (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL); multiplier means for multiplying a first signal with the reference signal, and multiplying a second signal, succeeding the first signal in time, with the reference signal, the first and second signals each being modulated on a carrier frequency (figure 2 multiplier after y(k) page 5/1 section II.A); decoder means for adjusting the multiplied first signal based on the multiplied first and second signals (figure 2 block in dot lines label module of turbo-decoder page 5/1 section II.A); and detector means for comparing the adjusted first signal with the multiplied first signal, the detector means comprises tuning means for tuning the reference frequency as a function of the comparison (figure 2 phase detector page 5/1 section II.A).

As per claim 33 Langlais et al. teach a method of processing signals having a first and second symbol each representing a constellation point, the first symbol preceding the second symbol in time, the method comprising: quantizing the first symbol to its nearest constellation point as a function of the first and second signals (figure 2 d(k) output of the slicer page 5/1 section II.A); comparing the first symbol to the quantized first symbol (figure 2 phase detector page 5/1 section II.A); and adjusting a reference frequency as a function of the comparison (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 34 Langlais et al. teach a method of receiving the first and second symbols before the first symbol is quantized (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 35 Langlais et al. teach a method of transmitting the signals including the first and second symbols, wherein the receiving of the first and second symbols comprises receiving the transmitted signals (figure 2 input to the multiplier page 5/1 section III.A).

As per claim 36 Langlais et al. teach that the transmission of the signals comprises turbo encoding the first and second symbols before transmission (figure 2 page 5/1 section II.A first paragraph).

As per claim 40 Langlais et al. teach that the received first and second symbols are each modulated on a carrier frequency, the method further comprising multiplying each of the first and second symbols with a reference signal having the reference frequency (figure 2 multiplier page 5/1 section II.A first paragraph).

As per claim 41 Langlais et al. teach that the multiplication of the first and second modulated symbols each comprises recovering the respective symbol by removing the respective carrier frequency (figure 2 inherit to the multiplier page 5/1 section II.A first paragraph).

As per claim 42 Langlais et al. teach that the first and second symbols each comprises turbo encoded data (figure 2 page 5/1 section II.A first paragraph).

As per claim 43 Langlais et al. teach that the quantization of the first symbol comprises Viterbi decoding the first symbol (figure 2 page 5/1 section II.A first paragraph).

As per claim 44 Langlais et al. teach that the comparison of the first symbol with the quantized first symbol comprises detecting a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A first paragraph).

As per claim 45 Langlais et al. teach that the adjustment of the reference frequency comprises tuning a voltage controlled oscillator as a function of the phase difference between the first symbol and the quantized first symbol (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 47 Langlais et al. teach a receiver to receive a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time, the receiver comprising: a decoder to quantize the first symbol as a function of the first and second symbols (figure 2 turbo-decoder block page 5/1 section II.A); a detector to compare the first symbol to the quantized first

symbol (figure 2 phase detector page 5/1 section II.A); and an oscillator having a tunable output as a function of the comparison (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 48 Langlais et al. teach that the first and second symbols are each modulated on a carrier frequency, the receiver further comprising a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 49 Langlais et al. teach that the decoder comprises a Viterbi decoder (figure 2 page 5/1 section II.A).

As per claim 50 Langlais et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A).

As per claim 51 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 53 Langlais et al. teach a communication system, comprising: a transmitter to transmit a signal including first and second symbols each representing a constellation point, the first symbol preceding the second symbol in time (page 5/1 section I and inherited in figure 2 and section II); and a receiver including a decoder to quantize the first symbol as a function of the first and second symbols, a detector to compare the first symbol to the quantized first symbol, and an oscillator having a

tunable output as a function of the comparison (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 54 Langlais et al. teach that the transmitter modulates the first and second symbols on a carrier frequency, and the receiver further comprises a multiplier to multiply each of the first and second symbols with the oscillator output to recover its respective symbol by removing its respective carrier frequency (page 5/1 section I, figure 2 multiplier, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 55 Langlais et al. teach that the decoder comprises a Viterbi decoder (page 5/1 section II.A first paragraph and figure 2).

As per claim 56 Langlais et al. teach that the detector comprises a phase detector to detect a phase difference between the first symbol and the quantized first symbol (figure 2 phase detector page 5/1 section II.A).

As per claim 57 Langlais et al. teach that the oscillator comprises a voltage controlled oscillator (figure 2, figure 3 and page 5/1 section II.A the VCO in inherited in the PLL).

As per claim 58 Langlais et al. teach that the transmitter further comprises a turbo encoder to turbo encode the signals before transmission to the receiver (page 5/1 section I).

As per claim 59 Langlais et al. teach that the turbo encoder comprises a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal

(page 5/2 section II.A last paragraph inherit to the turbo trellis in the receiver will be the trellis in the transmitter and the interleaver).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12, 20, 26, 32, 37,52 and 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langlais et al. ("Synchronization in the carrier recovery of a satellite link using turbo-codes with the help of tentative decisions", IEE Colloquium on Turbo Codes in Digital Broadcasting - Could It Double Capacity? 22 Nov. 1999 pages: 5/1 - 5/7) as applied to claim 11 above, and further in view of Robertson et al., "Bandwidth-Efficient Turbo Trellis-coded Modulation Using Punctured Component Codes," IEEE Journal on Selected Areas in Communications; 02/1998,.p.p. 206-218,. Vol. 16, No. 2).

As per claims 12, 37 and 61 Langlais teach claims 11, 36 and 58. Langlais doesn't specifically teach that the signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission. Robertson teaches that the turbo-coded transmitted signals comprise interleaving and de-interleaving of the turbo encoded signals before transmission (figure 2 and 2 page 208 section II the encoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of

ordinary skill in the art to integrate the interleaving and de-interleaving of the turbo encoded signals before transmission taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the first encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder.

As per claims 20, 26, 32 and 52 Langlais et al. teach claims 15, 21, 27 and 47. Langlais doesn't teach a switch between the multiplier and the decoder input. Robertson teaches a switch between the multiplier and the decoder input (figures 4 and 5 pages 211, 212 and 213 section III the decoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder.

As per claim 59 Langlais et al. teach claim 58. Langlais doesn't specifically indicate the turbo encoder comprising a trellis encoder to encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal. Robertson specifically teaches (title: "...turbo trellis-coded...") a turbo encoder comprising a trellis encoder to

encode a first portion of the signals including the fist and second symbols, and an interleaver coupled to a trellis encoder to process a second portion of the signal (figures 1 and 2 page 207 section II the encoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to supplement the turbo trellis code and the interleaving turbo-trellis encoded signals taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to obtain a more powerful bandwidth-efficient encoder (Roberson page 206 abstract).

As per claim 60 Roberson and Langlais teach claim 59. Roberson also teaches that the receiver further comprises a switch positioned before the decoder to pass only the first portion of the signal to the decoder (figures 4 and 5 pages 211, 212 and 213 section III the decoder). Langlais and Roberson teachings are analogous art because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate the switch between the multiplier and the decoder input taught by Roberson with the carrier recovery scheme taught by Langlais. The suggestion/motivation for doing so would have been to ensure that the ordering of the two information bits partly defining each symbol corresponds to that of the encoder (Roberson page 208 section II. A) and to reduce the latency of the turbo decoder.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shibuya et al. (US 6490010) disclose a carrier recovery circuit and a receiver for use in satellite digital television broadcasting and more particularly to an AFC circuit, a carrier recovery circuit and a receiver for regenerating a carrier even at the time of low C/N ratio.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. G

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER

JAT 12-13-2004